NATIONAL SCIENCE FOUNDATION
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NSF 20-118

Dear Colleague Letter: UKRI/BBSRC-NSF/BIO Lead Agency Opportunity in Biological Informatics, Microbes and the Host Immune System, Quantum Biology and Synthetic Cell

August 31, 2020

Dear Colleagues:

SCOPE

The US National Science Foundation (NSF) and UK Research and Innovation (UKRI) have signed a Memorandum of Understanding (MOU) on Research Cooperation. The MOU provides an overarching framework to encourage collaboration between US and UK research communities and sets out the principles by which jointly supported activities might be developed. The MOU provides for a lead agency arrangement whereby proposals may be submitted to either NSF (via Research.gov or Grants.gov) or UKRI (via Je-S).

The NSF Directorate for Biological Sciences (NSF/BIO) and the UKRI Biotechnology and Biological Sciences Research Council (BBSRC) are pleased to announce new topical areas associated with the lead agency opportunity. The lead agency opportunity allows for reciprocal acceptance of merit review through unsolicited mechanisms. Its goal is to help reduce some of the current barriers to working internationally.

2020/2021 NOTICE OF INTENTIONS

The lead agency opportunity allows US and UK researchers to submit a single proposal that will undergo a single review process by the lead agency, on behalf of both NSF/BIO and BBSRC. In 2020/2021 proposals will be accepted for UK-US collaborative projects in the areas of intersection between NSF/BIO and BBSRC as set out in the notice of intentions.

Proposals must address the priorities of both BBSRC and participating NSF/BIO Divisions. Proposers must provide a clear rationale for the need for a US-UK collaboration, including the unique expertise and synergy that the collaborating groups will bring to the project. Proposers should note that the lead agency opportunity does not represent new funding. Proposals will

be assessed in competition with all others submitted to the priority areas and agency programs identified in this DCL, and outcomes will be subject to both success in merit review and the availability of funds from both BBSRC and NSF/BIO.

Proposals relevant to the following priority areas and agency programs are eligible to apply for the lead agency opportunity in 2020/2021.

BIOLOGICAL INFORMATICS

Proposals are invited that address the development of novel informatics approaches and cyberinfrastructure resources to enable novel and effective use of data in biological research, addressing key challenges faced by researchers and supporting generation of new knowledge from biological data. Proposals must be aligned to BOTH NSF's Division of Biological Infrastructure programs in informatics and cybersecurity AND BBSRC's Data Driven Biology Responsive Mode priority. In addition, Principal Investigators (PIs) are advised to consult the appropriate program officer to ensure that their portion of the project is compliant with the targeted program.

Proposals should be submitted to:

- NSF 18-595 Infrastructure Innovation for Biological Research (IIBR)
- NSF 18-594 Infrastructure Capacity for Biology Core Program (ICB)
- BBSRC Responsive Mode 21RM1

MICROBES AND THE HOST IMMUNE SYSTEM

Proposals are invited that take an integrated approach to answer important questions relating to the immune system and host-microbe interactions. Microbes impact their hosts in manners that result in greatly different outcomes, which can include symbiotic, mutualistic or pathogenic infection. Key to these outcomes is the response and resilience of the host innate and adaptive immune system, as well as the microbial players (bacterial, fungal, viral) and the underlying physiological context. Relevant areas of investigation include systems using genetically-similar hosts or microbes that result in different phenotypic outcomes of infection. The use of comparative cross-species approaches to develop insights that have broad relevance across biological organisms is encouraged, as is research to understand the influence of co-infection and the wider microbiome, and the influence of host physiology through the life course. Proposals should aim to identify molecular mechanisms or develop systems-level understanding. Proposals that focus on industrial applications will not be accepted. Proposals that focus solely on human or mouse immune systems will not be accepted. Proposals must aim to progress knowledge of immunology in non-human animals or plants.

Proposals should be submitted to:

- NSF 20-536 Division of Integrative Organismal Systems Core Programs
- BBSRC Responsive Mode 21RM1

QUANTUM BIOLOGY

Proposals are invited that seek to investigate the biological molecules and biomolecular systems that give rise to quantum mechanical effects in living organisms. Studies have shown that such phenomena are important to a number of fundamental biological processes, including photosynthesis, olfaction, cellular respiration and vision, yet the specialized features that enable such effects are not well understood. Relevant areas of investigation include the features of proteins that enable quantum effects to occur at physiological temperatures, and the significance of the relatively large size of most protein complexes that exhibit quantum phenomena in contributing to the superposition of quantum states that give rise to quantum entanglement or quantum coherence. Mechanistic insight into the extended coherence times observed in biological systems are also of interest. In addition to biophysical mechanisms, proposals that aim to provide insights into the prevalence of quantum phenomena in biological systems across the tree of life and their evolutionary origins are also welcome. Proposals must aim to progress biological understanding and are expected to integrate research and methodologies from both (bio)physics and biology.

Proposals should be submitted to:

- NSF 18-585 Division of Molecular and Cellular Biosciences: Investigator Initiated Research Projects
- BBSRC Responsive Mode 21RM1

SYNTHETIC CELL

Can we design, build and control a synthetic cell? Realizing this grand challenge will enable us to uncover the molecular and physical organization of cells that enable storage and transmittal of information, capture and transformation of energy, and adaptation and regulation of cellular systems that make life possible. Natural cells emerge from the coordinated operation of a large number of biomolecules with their environment. One goal of synthetic cell research is to decipher the basic requirements of a living cell by understanding the myriad functions that make it resilient and adaptive. To this end, proposals are expected to focus on building a synthetic cell in order to understand biology. For example, the identification of genes, metabolic pathways and cellular components and the molecular mechanism by which they exert their function can inform and accelerate the design and building of synthetic cells. Such cells might be protocells containing only the most basic cellular components that allows an understanding of the origin of life, artificial cells that contain both natural and synthetic cellular components or minimal cells that use natural molecules to build self-replicating cellular entities through 'bottom up' approaches. Proposals

focused exclusively on building a synthetic cell as a biomanufacturing platform or as a therapeutic moiety will not be accepted.

Proposals should be submitted to:

- NSF 18-585 Division of Molecular and Cellular Biosciences: Investigator Initiated Research Projects
- BBSRC Responsive Mode 21RM1

PROPOSAL PREPARATION AND SUBMISSION

There is a 2-stage application process (see timeline below).

STAGE 1: INTENTION TO SUBMIT

1. Prior to submission of a full proposal, proposers will discuss within their research team where they feel the largest proportion of research lies (typically, this means largest budget request) and agree on a proposed lead agency (either NSF/BIO or BBSRC). Where advice is required about lead agency or fit of the proposal to the written notice of intentions, the proposer should contact the appropriate program officer at the proposed lead funding agency to discuss the research project. The program officer will then confirm that his/her agency will act as lead funding agency (and subsequently inform the other participating agency) or will consult with the other agency to identify a new lead funding agency prior to returning a decision to the proposer (generally within 10 working days).
2. Proposers will then be required to submit a PDF Intention to Submit (ITS) by email to the proposed lead agency that outlines the research proposed, research teams involved, and bottom line estimates of funding to be requested from the NSF/BIO and BBSRC. The ITS should not exceed 2 pages.
    a. Where BBSRC is the proposed lead agency, the ITS should be submitted via the Je-S system (see further guidance on the BBSRC website).
    b. Where NSF/BIO is the proposed lead agency, the ITS should be submitted via email to NSFBIOBBSRC@nsf.gov. The ITS must identify the participating program to which the ITS is directed.
3. The ITS will be shared with the non-lead agency to check for eligibility (namely whether the proposed research fits within the participating agencies' portfolio, the scope of the notice of intentions and whether the proposed researchers and institutions meet the agencies' funding eligibility requirements). The ITS will also be used to gauge proposal pressure by program and assist programs with budget planning.

STAGE 2: FULL PROPOSALS

1. If the ITS presents an eligible research project based on the eligibility description above,

the subsequent full proposal must be submitted in accordance with the proposal preparation requirements of the lead agency, i.e., for NSF, the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) and for BBSRC, the BBSRC Grants Guide.

2. The proposal should include a description of the full proposed research program and research team and describe the total resources for the joint project (that is, the funds requested from both the NSF/BIO and BBSRC). However, the budget forms submitted to the lead agency should only indicate the amount requested from that agency. A copy of the proposed requested budget of the non-lead agency should be included as part of the full proposal (in the case of NSF, this should be added as a "Supplementary Document"; in the case of BBSRC, this should be added as an attached document to the grant application). For proposals submitted to NSF, UK personnel should be listed as other Senior Personnel. Listing UK partners as Senior Personnel will help ensure that NSF systems automatically request additional documents that are required. Information on "current and pending support" is required for all personnel listed as "senior personnel".
3. For projects involving human subjects/participants or animals, proposers will be advised about both NSF/BIO and BBSRC policies and asked to consult with appropriate staff at NSF/BIO or BBSRC prior to submitting a proposal.
4. The proposal should indicate that it is to be considered under this Lead Agency Opportunity by prefacing the title with 'BBSRC-NSF/BIO'.
5. The proposal will be submitted by established program deadlines or target dates determined by the lead agency. For NSF/BIO, proposals may be submitted at any time after the ITS is deemed eligible, but must be submitted within six months of the ITS to be considered for funding during the FY21 fiscal year.

MERIT REVIEW

1. Proposals will be reviewed in competition with other unsolicited proposals or with proposals received in response to a specific call by the lead funding agency (that is, proposals submitted to the Lead Agency Opportunity will not undergo a special review process).
2. Proposals will be reviewed in accordance with the lead agency's review criteria. While not identical, the NSF/BIO and BBSRC ask reviewers to evaluate the proposed project on both its scientific or intellectual merit as well as its broader or societal impacts. A description of the NSF merit review process is provided on the NSF merit review website at: https://www.nsf.gov/bfa/dias/policy/merit_review/index.jsp. A description of the BBSRC assessment process is provided on the BBSRC website at: http://www.bbsrc.ac.uk/funding/apply/apply-index.aspx.

FUNDING DECISION

1. After the reviews are received, program officers from the lead and non-lead agencies

will discuss the potential outcomes. Afterwards, the lead agency will use its usual internal procedures to determine whether a proposal will be awarded or declined. In the case of NSF, an award requires a formal recommendation by the Program Officer and then concurrence by the cognizant Division Director. NSF's Division of Grants and Agreements will review the proposal from a business and financial perspective. NSF funding decisions are subject to the availability of funds. Only the NSF Grants Officer can make commitments on behalf of the Foundation or authorize the expenditure of funds. In the case of the BBSRC, funding recommendations from Panels are received by Research Council Officers who, taking into account the availability of funds, will fund those proposals recommended for funding in the order identified by the Panel.

2. Proposers will be advised whether their proposal has been recommended for funding or will be declined by the lead funding agency. Proposers will receive copies of the unattributed reviewers' comments and, where applicable, a panel summary.
3. Once a proposer has been notified of a pending award, the non-lead researcher(s) associated with the project must submit a copy of the proposal to the non-lead agency so that each agency has complete documentation of the overall proposed research project.
4. If a proposal is recommended for funding, the US organization(s) will be supported by NSF/BIO and the UK organization(s) will be supported by BBSRC. NSF/BIO and BBSRC staff will review budgets to ensure that there are no duplications in funding.
5. Because the participating organizations have different funding cycles, it is possible that some projects will have delayed start dates in order to wait until funds become available.

AWARD CONDITIONS AND REPORTING REQUIREMENTS

1. NSF/BIO and BBSRC will clearly state in award notices and any related documents that awards resulting from this activity were made possible by the NSF/BIO-BBSRC Lead Agency Opportunity.
2. Awardees will be expected to comply with the award conditions and reporting requirements of the agencies from which they receive funding.
3. Researchers will be required to acknowledge both NSF and BBSRC in any reports or publications arising from the grant.
4. Requests for extensions will be considered by the funding agency using standard procedures. Requests for changes to awards will be discussed between the funding agencies before a mutual decision is reached.

TIMELINE

Intentions to Submit

- Deadline for ITS (BBSRC and NSF/BIO) - October 21, 2020

Feedback on ITS will be provided 3 weeks after the submission deadline.

Full proposals

- BBSRC Responsive Mode 21RM1 application deadline - January 2021 (TBC)
- NSF/BIO - Full proposals accepted anytime

CONTACTS

BBSRC International Collaborative Agreements
Email: inca@bbsrc.ac.uk

NSF/BIO BBSRC working group
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